REMARKS

Claims 1, 4-13 are in the application. Claims 9-13 have been withdrawn from consideration. Claims 1 and 7 have been amended to better distinguish from the new combination of references cited in the Final Rejection.

Claim 1 has been amended to recite the metal powder content of claim 3 and the spherical nature of the copolymer particles as disclosed on p. 4, l. 20-26. Claim 7 has been amended to recite the relationship between the copolymer and the metal powder in the melted and cooled composition of claim 1, namely the metal powder is dispersed in the copolymer, as disclosed on p. 8, l. 19-20.

Reconsideration of the rejection is respectfully requested in view of these amendments and the discussion to follow.

The present invention as embodied in claim 1 involves the discovery that a particular PFA copolymer, tetrafluoroethylene/perfluoro(ethyl vinyl ether) copolymer, has substantially greater adhesion as a rotolining than tetrafluoroethylene/ perfluoro(propyl vinyl ether), when the small amount of metal powder recited in claim 1 is present in the composition. These copolymers can be called TFE/PEVE and TFE/PPVE, respectively. TFE/PPVE had been the only commercially available PFA copolymer until TFE/PEVE was discovered, only recently (p. 2, l. 27 to p. 3, l. 5).

Example 1 discloses the TFE/PEVE lining achieves a peel strength which is more than double that of the TFE/PPVE lining, both linings containing only 0.5 wt% Zn, and that similar improvement is obtained when the Zn is replaced by copper or tin powder. Example 2 compares the adhesion when the TFE/PEVE is stabilized and unstabilized, both containing 1 wt% Zn. When the Zn content is increased to 5 wt%, peel strength decreases by more than 70%.

Non-obviousness of claim 1 is indicated by (a) the novelty of the TFE/PEVE/metal powder combination as recited in this claim and (b) the lack of suggestion by the prior art of this combination. Independent of this lack of prior art suggestion, non-obviousness is also indicated by the surprising greater adhesion obtained when TFE/PEVE is used in place of TFE/PPVE. In this regard, surprising results are part of the claimed invention "as a whole" (35 U.S.C. 103(a)) and indicative of patentability, In re Soni, 34 USPQ2d 1684, 1687 (Fed. Cir. 1995), In re Chupp, 2 USPQ2d 1437, 1439 (Fed. Cir. 1987).

With respect to the rejection of claims as being obvious over Wu et al. (Wu) in view of JP 2904593 ('593), Wu is taken as disclosing the TFE/PEVE copolymer and particle size of claim 1, and '593 is taken as disclosing the addition of metal powder to PFA to suppress bubbling by the PFA during rotolining. The premise in the combining of '593 into Wu is that Wu would also like to suppress bubbles. Wu contradicts this premise by showing in his Examples of the invention that the

rotomolded articles are free from bubbles (col. 10, l. 57-58 and col. 11, l. 26-27). This bubble-free result is attributed to the spherical morphology of the fluoropolymer particles (microspheres) forming the subject of the Wu invention. There is no motivation arising from WU or '593 to utilize the '593 teaching of eliminating bubbles, when Wu has already solved the problem.

The copolymer particles of Applicant's claim 1 resemble the Wu particles insofar as particle shape is concerned, i.e. having a low sphere factor, which is the comparison of longest and shortest diameter of the particles.

The rejection acknowledges that neither Wu nor '593 disclose that the '593 metal powder improves adhesion, but dismisses Applicant's discovery as being inherent in '593. PFA by itself does not stick to the rotolined surface, but is held in place by mechanical interlock between the lining and the configuration of the rotolined surface (p. 1, l. 26-34). Indeed, this is why the Wu microspheres can be used both for rotolining and rotomolding (col. 5, l. 39-40). Rotomolding requires that there be no adhesion between the lining and the mold so that the rotomolding can be removed from the mold. Under this circumstance, it should be obvious that if '593 obtained adhesion of the lining, this unusual result would have been disclosed. The lining 3 in container body 1 of Fig. 1 of '593 is sufficiently rigid from its minimum 2.5 mm thickness [0019] and [0021] that it retained in place by the encapsulated (enclosed) shape of container 1. Instead of foreseeing inherency of an adhesion result in '593, one skilled in the art would understand that '593 does not obtain adhesion of the lining.

The assertion of inherency of the adhesion result also overlooks the breadth of the '593 disclosure of additives to the PFA and the amount of such additives. The additives disclosed are glass, silver, silicon, zinc, aluminum, copper, and the like [0007]. The amount of additive is 0.1 to 30 wt%, preferably 5 wt% [0018]. Applicant found that in small amounts, aluminum causes bubbles (p. 27-29) and that 5 wt% Zn gives very poor adhesion (Example 2). One skilled in the art is not guided to and does not foresee the selection of 0.2 to 2 wt% metal powder to obtain a result contrary to experience with PFA, adhesion of the lining surface, which is absent from the disclosure in '593.

The rejection takes Wu as disclosing TFE/PEVE. Wu discloses TFE/PPVE (col. 3, l. 35), not TFE/PEVE as recited in claim 1. '593 does not specifically disclose TFE/PEVE. The combination of Wu and '593 does not suggest TFE/PEVE and gives no hint that TFE/PEVE achieves much greater adhesion than TFE/PPVE when the small amount of metal powder is added to the fluoropolymer.

Claim 7 is additionally patentable by the recitation of the small amount of metal powder being dispersed in the TFE/PEVE, instead of acting in accordance with the

teaching of '593 to adhere to bubbles so as to release them to the outside (surface) of the lining [0017]. '593 uses a powder free top (second) layer to prevent fine powder from the first layer from escaping from the first layer [0023].

Claim 8 is additionally patentable by reciting the stabilization of the TFE/PEVE, which the rejection views as being well known in the art to reduce or eliminate degradation of the polymer (during melt processing). One skilled in the art also knows that degradation causes bubble formation during melt processing. '593 teaches the elimination of the bubble problem by the fine powder addition. '593 does not suggest that the bubble problem should be solved by polymer stabilization, whereby the fine powder additive would be unnecessary.

Winegar et al. (U.S. Patent 4,312,961) cited against the recitation of tin in claim 5 does not anticipate the adhesion result obtained by the invention of this claim and does not cure the deficiencies of Wu and '593, which fail to suggest the invention of parent claim 1.

Claim 1 recites a fluoropolymer not disclosed in the art of record to obtain a result not disclosed in the art of record. It is respectfully submitted that this provides a reasonable basis for non-obviousness and therefore patentability. The surprising adhesion advantage of TFE/PEVE over TFE/PPVE provides additional reason for patentability.

In view of the foregoing, allowance of the above-referenced application is respectfully requested.

Respectfully submitted,

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